

initiation of the immune response seems to take place. These findings from a murine GN model suggest that the transfer of in vitro expanded autologous Treg might represent a new treatment option in human GN.

KATHRIN HOCHEGGER, DOMINIK WOLF, and ALEXANDER R. ROSENKRANZ  
Innsbruck, Austria

Correspondence to Alexander R. Rosenkranz, Innsbruck Medical University, Clinical Division of Nephrology, Anichstrasse 35, 6020 Innsbruck, Austria.  
E-mail: alexander.rosenkranz@uibk.ac.at

## REFERENCES

1. JAVAI B, QUIGG RJ: Treatment of glomerulonephritis: Will we ever have options other than steroids and cytotoxics? *Kidney Int* 67:1692–1703, 2005
2. SAKAGUCHI S, SAKAGUCHI N, ASANO M, *et al*: Immunologic self-tolerance maintained by activated T cells expressing IL-2 receptor alpha-chains (CD25). Breakdown of a single mechanism of self-tolerance causes various autoimmune diseases. *J Immunol* 155:1151–1164, 1995
3. SAKAGUCHI S: Naturally arising CD4+ regulatory t cells for immunologic self-tolerance and negative control of immune responses. *Annu Rev Immunol* 22:531–562, 2004
4. WOLF D, HOCHEGGER K, WOLF AM, *et al*: CD4+CD25+ regulatory T cells inhibit experimental anti-glomerular basement membrane glomerulonephritis in mice. *J Am Soc Nephrol* 16:1360–1370, 2005

# Aldosterone-mediated endothelial remodeling and oxidative stress

**To the Editor:** The recognition of the inflammatory and profibrotic role of aldosterone in the pathophysiology of cardiovascular disease, via its effect on endothelial dysfunction, is of growing importance, as demonstrated by the results of the recently concluded Randomized Aldactone Evaluation Study (RALES) [1], and the Eplerenone neuroHormonal Efficacy and SURvival Study (EPHESUS) [2]. These studies have, in fact, indicated the reduction of aldosterone effects through receptor blocking as additional benefit to patients with cardiovascular diseases.

In a paper published in the May issue *Kidney International*, Oberleithner documented “in vitro” an aldosterone remodeling effect on human endothelium through induction of cell stiffness due to a presumably aldosterone induced oxidative stress via modulation of NAD(P)H oxidase [3]. We would like to provide further support to the contention of a specific remodeling and profibrotic action of aldosterone with the demonstration “ex vivo” in

human mononuclear cells, recently published by our laboratory [4], that indicates that aldosterone has a direct effect on oxidative stress through its ability to increase the levels of p22<sup>phox</sup>, an important subunit of NADPH oxidase, essential for superoxide anion generation. It, in fact, functions as an integral subunit of the final electron transport from NADPH to heme and molecular oxygen in generating superoxide anions. The aldosterone-induced increased level of PAI-1, a recognized profibrotic protein, we have shown in the same study [4], may also provide a direct link to the cardiovascular profibrotic and remodeling action of aldosterone. Our findings were further strengthened by similar effects shown by glycyrrhetic acid [4], a constituent of licorice root, which is known to have a direct mineralocorticoid-like effect [5]. Thus, the report of Oberleithner [3] in combination with the results of our study provides clear evidence for the aldosterone-related vascular remodeling effects through its induction of oxidative stress and oxidative stress-related profibrotic molecules, such as PAI-1 [4].

LORENZO A. CALÒ and DECIO ARMANINI  
Padova, Italy

Correspondence to Lorenzo Calò, M.D., Ph.D., Department of Clinical and Experimental Medicine, Clinica Medica 4, University of Padova, Via Giustiniani, 2, 35128 Padova, Italy.  
E-mail: renzcalo@unipd.it

## REFERENCES

1. PITT B, ZANNAD F, REMME WJ, *et al*: The effect of spironolactone on morbidity and mortality in patients with severe heart failure. Randomized Aldactone Evaluation Study Investigators. *N Engl J Med* 341:709–717, 1999
2. PITT B, REMME W, ZANNAD F, *et al*: Eplerenone Post-Acute Myocardial Infarction Heart Failure Efficacy and Survival Study Investigators: Eplerenone, a selective aldosterone blocker, in patients with left ventricular dysfunction after myocardial infarction. *N Engl J Med* 348:1309–1321, 2003
3. OBERLEITHNER H: Aldosterone makes human endothelium stiff and vulnerable. *Kidney Int* 67:1680–1682, 2005
4. CALÒ LA, ZAGHETTO F, PAGNIN E, *et al*: Effect of aldosterone and glycyrrhetic acid on the protein expression of PAI-1 and p22<sup>phox</sup> in human mononuclear leukocytes. *J Clin Endocrinol Metab* 89:1973–1976, 2004
5. ARMANINI D, LEWICKA S, PRATESI C, *et al*: Further studies on the mechanism of the mineralocorticoid action of licorice in humans. *J Endocrinol Invest* 19:624–629, 1996

# Screening for microalbuminuria

In their recent contributions to *Kidney International*, de Zeeuw [1], as well as de Jong and Brenner [2], argue that primary prevention of cardiovascular and renal disease may be possible by lowering albumin excretion in